

Attorney's Docket No.:14083-004002

Amendment to the Claims:

This listing of claims replaces all prior versions, and listings, of claims in the application:

1. (Previously Presented) An assembly comprising:
an actuator with a longitudinal axis having a fixed end,
and a free end configured to translate in three orthogonal
directions with respect to said fixed end;
a multiple bar linkage having first and second links
mutually constrained to translate with respect to each other,
and wherein said first link is fixed to a reference
structure and said second link is constrained to translate in a
direction generally parallel to the longitudinal axis of said
actuator; and
a coupling having first and second ends, said first end
being fixed to said actuator proximate to a free end of said
coupling, and said second end being fixed to said second link,
the coupling adapted to transmit displacement in a direction
substantially parallel to the longitudinal axis of said
actuator.

2. (Original) The assembly of claim 1, wherein said
actuator has a z-axis translating section, and an x and y-axis
translating section disposed between said fixed end and said z-
axis translating section.

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3. (Previously Presented) The assembly of claim 2, wherein said reference structure is mechanically independent from translation of said z-axis translating section, but mechanically responsive to said x and y-axis translating section.

4. (Previously Presented) The assembly of claim 3, wherein said reference structure is fixed to said multiple bar linkage to deflect said multiple bar linkage in X and Y directions in response to X and Y deflections of said x and y-axis translating section.

5. (Previously Presented) The assembly of claim 4, wherein said multi-bar linkage further includes a first mirror fixed to at least one of said links of the multiple-bar linkage, and a second mirror fixed to another of said links of said multi-bar linkage.

6. (original) The assembly of claim 5, wherein the assembly is adapted to be supported in a chassis, and further wherein said first mirror is disposed in the path of a light beam from a light source mounted on said chassis and is disposed to reflect the light toward said second mirror.

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7. (Previously Presented) The assembly of claim 1, wherein the assembly is in a scanning probe microscope.

8. (original) The assembly of claim 1, wherein said actuator is a piezoelectric actuator.

9-13 (Cancelled)

14. (Currently Amended) ~~The apparatus of claim 12,~~ The assembly of claim 1, wherein said actuator has a z-axis translating section, and an x and y-axis translating section disposed between said fixed end and said z-axis translating section

wherein said measuring device includes a movable bar assembly coupled to the actuator and to a reference structure, said bar assembly having a reflecting surface that is adapted to deflect said beam, and wherein said bar assembly is responsive to movement of the actuator so as to change the direction of said deflected beam.

15. (original) The apparatus of claim 14, wherein said bar assembly includes a first link having a first end attached to the actuator and a second end, and a second link defining said

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reflecting surface and having a first opposed end rotatably attached to said second end and a second opposed end rotatably attached to said reference structure.

16. (original) The apparatus of claim 14, wherein said reference structure is tubular and generally surrounds the actuator.

17. (original) The apparatus of claim 16, wherein said reference structure is configured to allow said light beam and said deflected beam to pass therethrough.

18. (original) The apparatus of claim 17, wherein said reference structure has an inner surface.

19. (original) The apparatus of claim 18, further including a reflective surface fixed to said inner surface to steer said beam toward said reflecting surface.

20. (original) The apparatus of claim 14, wherein said bar assembly includes a link having opposed ends, a first opposed end rotatably attached to the actuator and a second opposed end rotatably attached to said reference structure.

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21. (original) The apparatus of claim 14, wherein said bar assembly comprises a four bar linkage including first and second reflecting surfaces, said surfaces disposed to reflect light such that the incoming and outgoing beams are generally parallel.

22-25. (Cancelled)

26. (original) A method for measuring movement of an actuator in a metrology apparatus, the method comprising:
providing a movable bar assembly coupled to the actuator and to a reference structure; and
measuring, in response to movement of the actuator, movement of said movable bar assembly, wherein movement of said movable bar assembly is indicative of movement of the actuator.

27. (original) The method of claim 26, wherein said movable bar assembly includes a first link having a first end attached to the actuator and a second end, and a second link defining said reflecting surface and having a first opposed end rotatably attached to said second end and a second opposed end rotatably attached to said reference structure.

28. (Cancelled)

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29. (Currently Amended) ~~The apparatus of claim 28,~~ An apparatus for measuring movement of an actuator, the apparatus comprising:
an optical measuring device including a source of
electromagnetic radiation that generates a beam;
a sensor that detects a position of said beam; and
wherein, in response to movement of the actuator, said
optical measuring device changes the position of said beam
further including a reference frame wherein said reference frame
has a longitudinal axis that is generally co-linear with the
longitudinal axis of the actuator.

30. (original) The apparatus of claim 29, wherein said
measuring device includes a movable bar assembly that is
attached to said actuator at a first end of said bar assembly,
and is attached to said reference frame at a second end of said
bar assembly, and wherein said bar assembly defines a reflecting
surface that reflects said beam towards said sensor.

31. (original) The apparatus of claim 30, wherein said
reference frame includes an inner surface and said measuring
device further comprises a reflective surface fixed to said
inner surface that steers said beam towards said reflecting

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surface, said reflecting surface deflecting said beam towards said sensor.

32. (original) The apparatus of claim 30, wherein said reference frame is configured to allow said beam and said deflected beam to pass therethrough.

33-37. (Cancelled)